CHAPTER 1

MANAGEMENT SAFETY AND SUPERVISION

Chapter Objective: *Upon completion of this chapter, you will have a working knowledge of the AME work center supervisor's responsibilities for a continuous safety program.*

The *Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards,* NAVPERS 18068 (series), states that the AME is responsible for the maintenance of many systems. Some of these systems are covered in this manual. Other areas that the AME1 and AMEC must be qualified in are maintaining work center records, preparing reports, and training and leadership. The training and leadership responsibilities are addressed in the *Aviation Maintenance Ratings Supervisor,* NAVEDTRA 10343-A1, which you should complete along with this training manual (TM).

Senior AME personnel, because of the inherent dangers involved in the duty, must be more concerned with personnel and equipment safety than senior petty officers in other aviation ratings. Because of this concern, management, safety and supervisory information is presented here as a separate chapter, as well as in other places throughout this training manual.

SAFETY

Learning Objective: *Identify safety precautions for working with hazardous substances and equipment.*

In the AME rating there are many ways for a careless or inexperienced worker to hurt himself or others and damage equipment. In fact, no other aviation ratings has more potential for loss of life or violent destruction of property than the AME rating. Because of the inherent dangers associated with survival equipment, AME supervisors must be able to recognize and correct dangerous conditions, avoid unsafe acts, and train others to recognize and respect the importance of safety.

Each year Navy personnel operating and maintaining safety and survival equipment are involved in accidents. These accidents result in excessive repair and/or replacement cost amounting to millions of dollars and reduced operational readiness. The magnitude of this recurring loss emphasizes the necessity for preventing accidents, and the associated human suffering. Investigations have revealed two major reasons for most accidents with and around safety and survival equipment; (1) lack of effective training, (2) lack of supervision and leadership. The supervision, leadership, and training required for the proper operation and maintenance of safety and survival equipment are provided by the AME1 and the AMEC.

The term *safety,* as discussed in this course, is defined as *freedom from danger.* This definition covers both personnel and equipment. It does not mean that hazards will not exist (they will); but it does mean that if the hazards are known, safety awareness can and will help prevent accidents.

Safety is everybody's responsibility, and all hands are required to promote and adhere to safety rules and regulations. This is easy to say, and it is the ultimate aim of all supervisory personnel, but it is not easy to achieve.

The AME's interest in safety is personal. Ask anyone about safety and they will agree it's very important. This means everyone wants to be safe, but may feel that observing safety precautions slows down their work. Some feel they know the job so well that they don't have to be cautious. Still others think "there will be accidents, but to the other guy, not me."

It is these attitudes toward safety that place the burden of responsibility for safety on AME supervisory personnel. They must realize that accidents can happen anywhere, anytime, and

to anyone. The AME1 and AMEC must, where possible, ensure "freedom from danger" for his personnel and equipment.

The best method for the supervisor to meet his responsibility for safety is by a continuous safety program. This program should include inspection of work areas, equipment, and tools; interpretation of safety directives and precautions; and personal attention to personnel problems and differences.

The main objective of this chapter is to discuss the parts of a **SAFETY PROGRAM** that will reduce the human suffering and operational readiness losses due to aviation safety and survival equipment accidents.

ORGANIZATION AND ADMINISTRATION OF A SAFETY PROGRAM

Many supervisors feel that it is only necessary to provide safeguards, and safety will take care of itself. Safeguards are a step in the right direction, but they alone will not get good results. To establish a good safety record requires the establishment of a good safety program. Navy directives require all organizations to have an active safety training program. The safety program discussed in this manual is built around **EDUCATION, ENVIRONMENT, and ENFORCEMENT.**

ENVIRONMENTAL CONDITIONS

Environment, as it applies to safety, can be defined as the improvement or redesign of equipment, machinery, work area, or procedures. The objective of the environment is the elimination of hazards or providing adequate safeguards to prevent accidents. The objectives are the responsibilities of the supervisor. Briefly, the objectives of supervision are as follows:

1. To operate with maximum efficiency and safety
2. To operate with minimum efficiency and waste
3. To operate free from interruption and difficulty

While these are the primary objectives of supervision, it is important for you to remember that your new assignment is important to you personally. It gives you an excellent opportunity to gain practical experience toward eventual promotions to AMCS and AFCM.

WORK AREAS

Supervisory personnel should be especially aware of shop cleanliness. A cluttered, dirty shop may cause personnel to become careless and inefficient. Look for spilled grease and oil. An otherwise "heads-up" man could become a "tails-up" man if spilled grease and oil is not cleaned up promptly. Notice rag storage. Oily rags should be kept in a closed metal container. Notice obstructions protruding from work benches and lying on decks, or items stowed on top of lockers. These are obvious dangers.

Less obvious hazards are poor work habits. Are the proper tools used for the tasks assigned? Are the established safety rules and regulations being followed? Is the shop lighting and ventilation adequate?

The hazardous conditions noticed by the AME during inspections should be corrected now, either by immediate action or training. General work center safety is covered more in the Aviation *Maintenance Ratings Supervisor* manual.

TOOLS

The inspection of tools should include type, condition, and use. As a general precaution, be sure that all tools conform to navy standards of quality and type. Remember that each tool has a place and should be in use or in that place. Each tool has a purpose and should be used only for that purpose.

If hand tools are dull, broken, bent, or dirty, corrective action is necessary. Tools that cannot be repaired should be replaced. Tools should be cleaned and kept clean. Portable tools should be inspected prior to each use to ensure they are clean and in the proper state of repair. The AME supervisor should be very critical of the tools within the work center. For more information on tools and their uses, refer to the *Aviation Maintenance Ratings Supervisor* manual.

EQUIPMENT

The AME supervisor will have many different kinds of equipment in his work center. The inspection of shop equipment should include checking for posted operational requirements and for safeguards such as goggles, hearing protectors, and protective clothing. Always check for leaks, frayed electrical cords, proper working conditions, and general cleanliness.

The inspection of work areas, tools, and equipment will point up hazards that must be corrected. Some corrections will be made on the spot, and some will have to be worked out through job improvements. The inspections will show the need for and the continuation of a good safety program. For more information on shop equipment, refer to the *Aviation Maintenance Ratings Supervisor* manual.

SAFETY INSPECTIONS

About 98 percent of all accidents can be prevented. This means that accidents can be prevented by educating personnel to the hazards or by completely eliminating the hazards. It's with this idea in mind that you will make your inspections. During the inspection, look for hazardous conditions that can be eliminated and for hazardous conditions that can be corrected through training. The two percent classified as unpreventable are caused by natural elements, such as wind, lightning, flooding, etc., and some steps can be taken to lessen these hazards.

Safety inspections should be continuous. A habit should be developed for noting everything. Everytime you walk through the shop, line area, around aircraft, or any area where your responsibility extends, think safety. When a hazardous condition is found, correct it. To put it off until later is to gamble with the safety of your men and equipment. The hard rule is that in matters of safety, "corrective action is required NOW."

SAFETY EDUCATION

Safety education depends on obtaining and passing out safety-related information. Safety information is gained through inspections, experience from directives, and by performing an analysis of job requirements. An effective safety program creates interest as well as supplies information.

The following examples point up the different ways safety information may be disseminated.

1. POSTERS—The Navy provides safety posters that should be posted in appropriate places to emphasize the safety message.

2. PRINTED MATERIALS—This covers the required reading list of safety precautions pertaining to safety. Printed material also covers physically posting operating procedures on the equipment.

3. GROUP DISCUSSIONS—Group discussions are usually conducted when the information is applicable to all hands. Safety movies fall into this category.

4. INDIVIDUAL INSTRUCTION—Individual instruction is normally given when the problem involves individual work habits or a particular hazard is pointed out to an individual during the work process.

ENFORCEMENT

Enforcement as it applies to safety is defined as the *formulation of rules and regulations and a safety policy that will be followed by all hands.* Enforcement includes reprimanding violators of safety rules, frequent inspections to determine adherence to rules, and continuous follow-up procedures to determine WHY THERE ARE VIOLATORS. Supervisors must enforce safety rules without fear or favor. Safety consciousness and the will of the worker to aid in preventing accidents lies with the supervisors. Supervisors must not jeopardize cooperation in safety by inconsistency in enforcement.

PLANNING FOR ADVANCED BASE OR FORWARD AREA OPERATIONS

AME Chiefs must be able to prepare for advanced base or forward area operations without sacrificing the safety program. They must estimate aircraft spare parts and supplies, equipment, and manpower requirements for aviation structural repair. In determining requirements for forward or advance base operations, consider the following:

1. Safety
2. Mission
3. Environment
4. Operating Factors
5. The availability of existing facilities

A knowledge of the material and manpower requirements listed in the *Advanced Base Initial Outfitting Lists of Functional Components* will be very helpful. The functional component is one of more than 300 standardized units of the system that the Navy has developed to enable it to build and operate its advanced bases in the least possible time and with minimum expenditure of planning and logistic effort.

A functional component is a list of the requirements for the performance of a specific

task at an advanced base. It is a carefully balanced combination of material, equipment, and/or personnel.

Each functional component is grouped according to its primary function into 1 of 11 major groups, including aviation. Each major group is identified by letter designation and title. The functional components contained in each are identified by a combination letter, number, and its title designation. The major group designation for aviation is "H."

"H" components are designed to provide maintenance, support, and operation of aircraft in an advanced area under combat conditions. "H" components may be combined with other functional components to form several types of air stations.

Complete information and data are given in the abridged and the detailed outfitting lists for functional components. It should be apparent to the AMEC that the advanced base requirements may not be exactly as they appear in the *Advanced Base Initial Outfitting Lists.* To use these lists as guides, it will be necessary, in most cases, to alter or tailor them to fit the individual needs of the unit about to deploy.

Other necessary repair parts, supplies, and equipment may be determined from the outfitting lists for the aircraft or other weapon systems to be supported.

It is quite likely that the AMEC will be required to advise the personnel office in making assignments of individuals to advance base or forward area operating units. It would seem logical that the number of AMEs assigned to deploy be in the same ratio as the percentage of supported aircraft scheduled to deploy. This may be true if the proposed flight hours per aircraft of the detachment exactly equalled the planned utilization of the remaining aircraft. There must also be no significant environmental problems to be overcome (i.e., excessive heat or excessive cold conditions, depending on the location of deployment). The list of personnel assigned to deploy should represent a cross section of the skill levels available unless special maintenance factors indicate otherwise. The selection of personnel should be made as objectively as possible so the deployed unit can function as safely and efficiently as possible.

SAFETY PRECAUTIONS FOR HAZARDOUS SUBSTANCES

Learning Objective: *Identify safety precautions for working with hazardous substances and equipment.*

There are many ways for a careless or inexperienced worker to hurt themselves or others on the job. This section discusses safety precautions in three hazardous work areas: liquid oxygen, gaseous oxygen, and high pressure air. Other specific safety precautions are discussed in OPNAVINST 5100.19 (series).

It has been said that every safety precaution has been originally written in blood. There is no room for complacency in the performance of AME tasks. Every job must be performed in a "heads-up" manner to ensure maximum safety awareness is maintained. Anything less can and will be disastrous.

LIQUID OXYGEN

Aviators breathing oxygen (ABO) comes in both gaseous (type 1) and liquid (type 11) states. Liquid oxygen (LOX) is converted to a gas before its delivered to the aircrew. LOX requires frequent monitoring to prevent contamination and to ensure safe use. A surveillance program is the primary method of ensuring that each operation in the LOX supply system is carried out in strict compliance with established procedures. Surveillance begins with procurement or generation of LOX and continues throughout storage, handling, transfer, and servicing of aircraft.

The best assurance of personnel safety lies in the safety education of the people themselves. The safety of personnel can be assured only when there is thorough understanding of potential hazards, the correct procedures and equipment are used, and the equipment is in good working condition. Knowledge of a job situation and appropriate safety equipment is vital to successful completion of a job. Follow established safety procedures in NAVAIR 06-30-501.

Description and Properties of Liquid Oxygen

Oxygen can exist as a solid or gas, depending upon the temperature and pressure under which it is stored. At atmospheric pressure, oxygen exists as a solid at temperatures below its melting point, – 361°F (–281°C). Solid oxygen turns into a

liquid at its melting point and remains in this state until the temperature rises to its boiling point, –297°F (–183°C).

At this latter temperature, LOX vaporizes into the gaseous state. Gaseous oxygen will turn into liquid at atmospheric pressure by cooling to a temperature below –297°F. By increasing the pressure, gaseous oxygen can be liquified at higher temperatures, up to its critical temperature, – 182°F (–119°C). Oxygen will not condense to a liquid at temperatures above its critical temperature regardless of the pressure applied. The pressure required to liquify oxygen at its critical temperature is known as its critical pressure, 736.5 psig. The application of high pressure and ultra-low temperatures to convert gases to their liquid state is known as the science and technology of cryogenics. LOX is a cryogenic fluid.

Physical Properties of Liquid Oxygen

Gaseous oxygen is colorless odorless, tasteless, and about 1.1 times as heavy as air. LOX is an extremely cold, pale blue fluid that flows like water. One gallon of LOX weighs 9.519 pounds, which is 1.14 times heavier than the weight of 1 gallon of water. LOX is stored and handled at atmospheric pressure in well-insulated containers that maintain the liquid at its boiling point (–297°F). Therefore, LOX is boiling as it slowly turns into gaseous oxygen. As the expanding gas from the boiling liquid increases in amount, it builds up pressure within the container. Therefore, the expanding gas must be vented to the atmosphere. Confinement of liquid oxygen can be dangerous to personnel, causing severe injury and death.

This section contains procedures and requirements for the quality control of LOX that is stored, transferred, handled, and used for breathing purposes by aircrews. This section applies to AME supervisors who must ensure all safety procedures and equipment are used during LOX servicing and handling by qualified personnel.

Personnel

Personnel selected to perform operations in the LOX supply system should be trained and have a thorough knowledge of the characteristics of LOX, the significance of contamination, and the dangers involved. Only those personnel who demonstrate understanding of safety and who maintain reliable performance should be assigned the duties and responsibilities of handling LOX.

LOX Contamination

During the handling and transfer of LOX, environmental contaminants must be prevented from entering the system. LOX strongly attracts and absorbs atmospheric gases. Contaminants make the ABO unusable. Conscientious attention to correct procedures during handling and transfer operations will prevent contamination and ensure safety.

The aircraft LOX converter system should be sampled and tested for contamination as follows:

Test for odor as soon as possible after a report of in-flight odors by the pilot or aircrew. Any abnormal psychological or physiological effects to an aircrew during or after flight should be cause to suspect possible oxygen contamination. Possible oxygen contamination should also be considered in any aircraft mishap when the circumstances of the mishap are vague or unknown. A sample should be taken and sent to a test site for analysis with supporting details of the incident, including history of the supply source of LOX. Appropriate reports must be submitted in accordance with OPNAVINST 3750.6. An information copy should be provided to the Naval Air Engineering Center program manager.

Applicable squadrons selected by area commands must, during each calender month, take a LOX sample from at least one filled converter and residual LOX from one converter (taken from an aircraft after a flight mission), and forward both to a test site for contamination checks.

Aircraft oxygen and LOX systems, and LOX converters, must be purged in accordance with the applicable maintenance instructions manual (MIM) and/or NAVAIR 13-1-6.4, *Oxygen Equipment Manual.* Purging is done when the system or the converter is left open to the atmosphere, when empty, or whenever contamination is suspected.

GASEOUS OXYGEN

The supervision of aviators gaseous breathing oxygen requires the same surveillance as for LOX. Adequate and reliable supervisory control of aviators gaseous breathing oxygen demands that each operation in the gaseous breathing oxygen supply, and aircraft servicing system, be carried

out in strict compliance with procedures established to assure safety of flight and mission completion.

This section establishes procedures and requirements for the quality control of gaseous oxygen that is stored, transferred, and used for breathing purposes by aircrews. This section is applicable to all personnel who are responsible for supervising or performing the operations associated with and servicing of the aircraft with aviators breathing oxygen.

Quality Control Requirements of Gaseous Oxygen

The procurement limits for purity and contamination, which include the absence of odor, of aviators gaseous breathing oxygen must meet the requirements of the current issue of MIL-O-27210.

The on-station monitoring of aviators gaseous breathing oxygen for contamination is performed by a sniff odor test.

WARNING

The odor test is very hazardous due to the high pressure in the cylinder. Do not place your face or nose directly into the venting gas stream and do not take deep breaths. Discontinue "sniffing" any gas at the first indication of irritation of the nasal passages or at any sign of physical discomfort. Some contaminants are extremely irritating, poisonous, or toxic, and can cause physical injury. The odor test can only be performed safely if the procedures are followed exactly.

NOTE

Persons temporarily unable to detect or classify odors because of head colds, hay fever, etc., must be excluded from the assignment of inspecting for the presence of odorous contaminants.

If an odor is detected, discontinue the inspection process. When detected, an attempt should be made to classify it, such as "acrid," "sweet, " "rotten egg," "glue like," etc., as this will help in the identification of the source of the contaminate.

Gaseous Oxygen Servicing Trailer

Gaseous oxygen servicing carts must be sampled and tested whenever contamination is suspected or after the completion of any maintenance action performed on the cart. An odor test must be conducted prior to servicing any aircraft system. This is accomplished by opening slightly the valve at the terminal end of the recharging hose and smelling the escaping gas in accordance with the procedures described in the A6-332AO-GYD-000. If an odor is present, the servicing cart will not be used to service the aircraft. Each cylinder must be inspected for the following:

- Proper painting and marking.
- Valves are tightly closed and not leaking.
- Safety caps and safety plugs are secure.
- Hydrostatic test date is current.
- All valves, manifold, servicing hose, and cylinders are clean and free of grease and oil. The presence of any grease or oil on the valves or cylinders must be reported to the maintenance officer for necessary action, and the servicing cart must be placed in a contaminated status.

HIGH-PRESSURE AIR

Using high-pressure compressed air safely requires knowledge and skills. Despite all the safety programs and posters regarding this shop hazard, reports of fatalities and serious injury from this cause continue to accumulate.

High-pressure compressed air is provided from one of three sources:

1. A portable high-pressure cylinder
2. A cascade-type servicing trailer equipped with several cylinders
3. Direct service from a portable high-pressure air compressor

Each of these sources is no less dangerous than the precautions already discussed for handling oxygen cylinders. Precautions apply generally as well for the handling and stowage of compressed air cylinders.

Do not fill any cylinder with a gas other than that gas for which the cylinder has been specifically designated. Explosive mixtures may

be formed when cylinders containing residual combustible gases such as hydrogen, propane, or acetylene are charged with air or oxygen. The reverse of this procedure is equally hazardous.

Cylinders used for aviators' breathing oxygen, dry nitrogen, dry argon, dry helium, or dry air that are found to have open valves and/or a positive internal pressure of less than 25 psi (gauge) should be tagged "Dry Before Refilling."

When operating the compressed air servicing trailers, (gaseous oxygen or nitrogen) the following precautions should be observed:

1. Only qualified operators should operate the trailers while charging. Complete familiarity with the trailer is a basic prerequisite for safe operation.
2. The servicing hose end and installation connection fitting should be thoroughly inspected prior to servicing and any foreign matter removed.
3. Never charge an installation without the proper fusible safety plug and blowout disc in the trailer charging system.
4. Always know the pressure existing in the system to be filled and the pressure in all cylinders to be used in the cascading process before starting charging operations.
5. A malfunctioning pressure regulator should be disconnected from the line by closing its associated shut-off valve. The trailer can then be operated with the remaining pressure regulator.
6. The charging hose should never be stretched tightly to reach a connection. Position the trailer so that the servicing hose is not under tension while charging.
7. Always open all valves slowly. The dangers of rapid cascade charging must be avoided. Compressed air should never be blown towards anyone, used for cleaning of personal clothing, or as a means of cooling off a person.

SAFETY PRECAUTIONS FOR EJECTION SEATS AND EXPLOSIVE DEVICES

Learning Objective: *Identify the importance of the ejection seat check-out program.*

Ejection seats have several inherently dangerous features that are a definite hazard to uninformed and/or careless personnel. Consequently, whenever the aircraft is on the ground, all safety pins must be installed and not removed until the aircraft is ready for flight. Caution must be observed at all times during maintenance of and around the seats to avoid injury and equipment damage by explosive devices of the seat. Safety precautions and correct procedures cannot be overemphasized.

Keep all cartridges away from live circuits. Under no circumstances should any person reach within or enter an enclosure for the purpose of servicing or adjusting equipment without the immediate presence or assistance of another person capable of rendering aid.

When removing cartridges for inspections or for safety reasons, they must be marked for identification so they can be reinstalled in the same device from which they were removed. Under no circumstances should an unmarked or unidentified cartridge be installed in any cartridge-actuated device.

Cartridges should be handled as little as practicable to minimize risk of fire, explosion, and damage from accidental causes. All safety devices must be kept in good order and used only as designated.

Cartridges must be stored where they will not be exposed to direct rays of the sun, and they must be protected from extremely high temperatures. When in containers, they must be stored in a cool, dry place where they can be readily inspected.

The seat must always be disarmed before removal from the aircraft because firing of the seat may occur. While handling percussion-fired cartridges, you must exercise extreme caution not to drop cartridges because they can fire upon impact.

The following general precautions should always be kept in mind.

1. Ejection seats must be treated with the same respect as a loaded gun.
2. Always consider an ejection seat system as loaded and armed.
3. Before you enter a cockpit, know where the ejection seat safety pins are located, and make certain of their installation.
4. Only authorized personnel may work on, remove, or install ejection seats and components, and only in authorized areas.

EJECTION SEAT CHECK-OUTS

The modern, high-performance aircraft used by todays Navy place extreme demands on emergency escape systems. These systems contain highly explosive devices that are designed for one-time use only. Actuation of these devices could

result in severe injury or death to personnel and damage to or destruction of aircraft. Therefore, due to the inherent dangers associated with ejection seats and canopy systems, a seat/canopy check-out procedure is required. The Egress/ Environmental Work Center (AME shop) is responsible for indoctrinating all personnel in the hazards and safety precautions associated with these systems. A thorough seat check-out will be given, by a qualified Aviation Structural Mechanic (Safety Equipmentman) (AME), to all newly assigned maintenance personnel prior to their performing any aircraft maintenance work on the aircraft, and every 6 months thereafter. In addition, any personnel removed from aircraft maintenance responsibilities for over 90 days must receive a seat check-out before performing any aircraft maintenance. The AME work center and the other maintenance work centers will maintain records of seat check-outs, including date given, date due, and the signature of the AME performing the check-out.

The seat check-out program will be established by a squadron MI. All personnel due seat check-out requalification will be listed in the monthly maintenance plan.

EJECTION SEAT CARTRIDGES AND CARTRIDGE-ACTUATED DEVICES (CAD)

The types of explosive devices incorporated in egress systems are varied. The AME working with these devices must know how they function, their characteristics, how to identify them, their service-life limitations, and all safety precautions.

The AME who understands the importance of all these factors and who correctly uses the maintenance manuals is better equipped to supervise and train others. The following manuals are required for the AME to meet the above requirements:

1. *Description, Preparation for use, and Handling Instructions, Aircrew Escape Propulsion System (AEPS) Devices,* NAVAIR 11-85-1
2. *General Use Cartridges and Cartridge Actuated Devices for Aircraft and Associated Equipment (CADS),* NAVAIR 11-100-1.1, NAVAIR 11-100-1.2, NAVAIR 11-100-1.3
3. Specific aircraft MIMs
4. OP 4, *Ammunition Afloat*
5. OP 5, *Ammunition and Explosives Ashore*

Service Life

The service life of a CAD is the specific period of time that it is allowed to be used. These periods of time are affected by various environmental conditions, which have resulted in the assignment of time limits or overage requirements. These limits are shelf life and installed life.

The establishment of service-life limits is based upon design verification tests, qualification tests, and surveillance evaluations. The established limits are approved by the Naval Air Systems Command. Therefore, the establishment of service-life time limits is not arbitrary and must be adhered to as specified.

Before deployment to areas that do not permit ready supply and servicing of cartridges or cartridge-actuated devices, an inspection must be made of all CAD service-life expiration dates. If, during this inspection, it is determined that a CAD will become overage during the period of the deployment, the CAD must be replaced prior to the deployment. Before installation of any CAD, the service life expiration date of the unit must be checked to ensure that the unit is not overage and will not become overage prior to the next periodic maintenance cycle of the aircraft.

During standard depot-level maintenance (SDLM), the expiration dates of all installed CADs must be checked. Those CADs assigned to organizational level for maintenance and have expiration dates prior to the next scheduled inspection after the aircraft is returned to its custodian must be replaced. CADs assigned to depot level for maintenance that have expiration dates falling prior to the next scheduled SDLM should also be replaced. The exception is systems replaced exclusively through the use of a field modification team. Adherence to these procedures will prevent loss of aircraft mission capability due to CAD service-life expiration.

Expiration Dates

To determine service-life expiration dates, both the shelf life and installed life must be computed. First, compute the shelf life of the CAD by using its lot number to determine the month and year of manufacture. Refer to table 1-1 to ensure correct interpretation of the lot number since there are currently two methods used to derive lot numbers. Obtain the established shelf life (number of months and years) for the individual CAD from the NAVAIR 11-100-1 series manual. Add this figure (shelf life) to the

Table 1-1.-Derivation of Lot Number

KEY	DEFINITION
a	Lot sequence number
b	Manufacturer's identification symbol
c	Month of production (two digit)
d	Year of production (two digit)
e	Month of production (single alpha) JAN - A MAY - E SEP - J FEB - B JUN - F OCT - K MAR - C JUL - G NOV - L APR - D AUG - H DEC - M
f	Interfix number
g	Lot suffix (alpha)

Example:
Lot Number, Method 1: 11 ABC 0578
Key: (a) (b) (c)(d)
(Note that (c) and (d) will be used to compute service life.)

Example:
*Lot Number, Method 2: XYE 78 E 001-011A
Key: (b) (d) (e) (f) (a)(g)
(Note that (d) and (e) will be used to compute service life.)
*Further details of explanation are available in MILSTD-1168A.

month and year of manufacture determined from the CAD lot number. The resulting sum (date) is the shelf-life expiration date of the CAD in question.

Example:

Lot number/date of manufacture	0579
+ Shelf-life in years	+ 6
Shelf-life expiration date	0585

Next, determine the installed-life expiration date of the CAD by referring to the NAVAIR 11-100-1 series manual. Obtain the installed-life figure (number of months or years), and add that figure to the date (month) the CADs hermetically sealed container was opened. The resulting sum (date) will be the installed-life expiration date for the CAD in question.

Example:

Date opened	0879
+ Installed life in months	+ 42
Installed-life expiration date	0283

Then, compare the two dates derived (shelf-life and installed-life). Whichever date occurs first is the CAD service-life expiration date.

Example:

Shelf-life	0585
Installed-life	0283
Service-life expiration date	0283

Since only the month and year are used in computing service-life dates, the date the hermetically sealed container is opened and the expiration date must be computed to the last day of the month involved. If the date the sealed container was opened is not available, the installed-life must be computed from the date of manufacture as determined from the lot number.

Marking Expiration Dates

Before installing a CAD in an aircraft system, both CAD service-life expiration dates (shelf-life and installed-life) should be computed. The time limit that is exceeded first will be the service-life expiration date of the CAD. The service-life expiration date must be entered in the aircraft logbook.

Use permanent ink for marking CADs with container opened dates and service-life expiration dates. Do not scribe, scratch, or eletroetch these dates, as damage will occur to the CAD's corrosion resistance surface. The marking pen, NSN 7520-00-043-3408, is available from GSA supply, and is recommended for this purpose.

When you install a CAD in an aircraft system, a log entry must be made on OPNAV Form 4790/26A, as directed by OPNAVINST 4790.2 (series). When a CAD's hermetically sealed container is opened, the container opened date and the service-life expiration date (month and year) must be marked with indelible ink on the container and on each CAD in the container.

Service-Life Extension

Contingency service-life extensions for the CADs listed in the NAVAIR 11-100-1 (series), not to exceed 30 days, may be granted by the commanding officer or his authorized representative. The extensions may be applied to a specific CAD on a one-time only basis when replacements are not available and failure to extend the service-life would disrupt flight operations. The contingency authority is granted on the condition that Naval Ordnance Station, Indian Head, Maryland; NAVAIRSYSCOM, Washington, D.C.; and SPCC, Mechanicsburg, Pennsylvania, be immediately notified by message or speed letter when such authority is exercised.

When the situation warrants, an additional service-life extension beyond the 30-day contingency extension may be requested by message from NAVORDSTA. All extensions beyond 30 days must be approved by the NAVORDSTA or NAVAIRSYSCOM. All approved additional service-life extensions will be transmitted by message to the activity making the request. When a service-life extension is granted, an entry must be made in the aircraft logbook. When an aircraft is transferred with a service-life extension in effect, the gaining activity must be notified, and no new contingency service-life extensions may be granted by the commanding officer of the gaining activity.

Service-life Change

The permanent service life of a CAD maybe changed only by a rapid action change (RAC), interim rapid action change (IRAC), or formal change to NAVAIR 11-100-1 (series) as directed by COMNAVAIRSYSCOM, Washington, D.C. If the change affects those items installed in an aircraft, the change will be recorded in the aircraft's logbook. A line will be drawn through the service-life expiration date shown and the new computed expiration date entered, citing the authority for the change; for example, message number, rapid action change number, or change number. Each new expiration date will supersede the previous date. The latest expiration date entered in the aircraft logbook will always be the final date the CAD may remain installed in the aircraft.

When a contingency service-life extension has been authorized for a specific CAD, the new computed service-life expiration date (month and year) will be added to the original aircraft logbook entry for that CAD. When an additional service-life extension has been granted for a specific CAD, the new service-life expiration date (month and year) will be added to the original aircraft logbook entry.

CAD Maintenance Policy

CAD maintenance policy prohibits unauthorized maintenance or adjustments to a CAD at any of the three levels of maintenance: organizational, intermediate, or depot. Authorized maintenance actions are limited to removal, inspection, and replacement, unless specifically detailed in the aircraft MIM or by a technical directive.

CADs and items of equipment in ejection systems are for one-time use only. They are never to be refurbished or used again after firing. This is equally true of functional equipment, rigid lines, plumbing lines, and hoses. Ejection seats and escape system components that have been used

in an ejection or fired, regardless of apparent condition, are prohibited from reuse, and must be disposed of as directed by OPNAVINST 4790.2 (series), OPNAVINST 3750.6 (series), and the applicable CAD and rocket manual.

Because of the extreme stress and strain to the ejection seats and escape system components during ejection, they cannot be reused. This stress could reduce the structural or mechanical reliability of these items. In the case of an inadvertent firing of a cartridge or CAD, all contaminated ballistic lines and devices must be replaced because of the corrosive nature of the explosive.

The service-life of wire-braid, Teflon®-lined hoses installed in ballistic applications is the same as that of the aircraft in which it is installed, unless it is used. A hose is considered to be used if the device to which it is attached is fired, either intentionally or accidentally. If this occurs, the hose and related fittings must be replaced. Before you install a hose or fitting (line, elbow, T, etc.) make sure that it is not contaminated with hydraulic fluid, oil, or a similar type of contaminant. All hoses in the escape system must be inspected for accidental damage at every phased inspection, upon seat removal, after removal of any part of the escape system, and for disconnection of any hose.

When CADs are not installed in an aircraft, the inlet and outlet ports must be sealed with protective closures to prevent the entrance of moisture and foreign matter. For shipping purposes, the safety pins and protective closures provided with the replacement CAD must be returned with the replaced CAD to ensure it is in a safe condition during handling and storage. During ejection system maintenance actions, all disconnected CADs and associated ballistic lines must be protected with flexible plastic plugs that conform to MIL-C-5501/10A and flexible plastic caps that conform to MIL-C-5501/11. NAVAIR 11-100-1.1 provides information relating to these caps and plugs,

Cartridges are carefully designed and manufactured, but their performance in cartridge-actuated devices is dependable only when they have been properly handled and installed. Care must be observed to maintain the devices in perfect condition.

Since individual cartridges cannot be tested, the responsibility for proper functioning is in the hands of the supervisor and the personnel who maintain them. The quality and reliability of an ejection system are largely dependent on the supervisors and the mechanics who maintain the systems.

Supervisors take note. Nothing is foolproof because fools are so ingenious. Personal safety for those who work around ejection seats cannot be guaranteed. A high level of safety can be achieved if personnel have the proper attitude, understanding, training, and most importantly adequate supervision. Unless proper maintenance procedures are followed exactly, even the most routine ejection seat maintenance tasks can grow drastically out of proportion and bring about an accident or injury. Education of the workers involved is the best assurance for personnel safety. The workers should be made aware of potential hazards and the proper means of protecting themselves. Workers should be assigned tasks according to their capabilities.

Reporting

All malfunctions, discrepancies, and accidents involving CADs must be reported by message to the Naval Ordnance Station, Indian Head, Maryland, in accordance with OPNAVINST 4790.2 (series). If the suspected defect is with the CAD, the message must be addressed to NAVORDSTA for action. If the report describes an inadvertent actuation of an aircraft system resulting in the CAD functioning normally, the action copy of the report must be submitted to the cognizant field activity (CFA) for the aircraft with an information copy to NAVORDSTA, Indian Head, Maryland. Accidents and incidents involving CADs may require reporting in accordance with OPNAVINST 3750.6 in addition to the OPNAVINST 4790.2 (series). Submission of the reports required by the maintenance instruction does not satisfy the requirements of the safety instruction. If dual reporting is required, you should ensure the reports are adequately cross-referenced to satisfy the requirements of all commands involved.

All CADs suspected of being discrepant, malfunctioning, or involved in an accident or incident must be clearly identified and turned in to the station or ship's ordnance or weapons department. These CADs must be marked "hold for 30 days for engineering investigation (EI) pending disposition instructions." The report should contain the turn-in document number, and it should identify the activity holding the material. If CFA response is requested, NAVORDSTA will respond with complete disposition and shipping instructions.

INSTALLED EXPLOSIVE SAFETY DEVICES (OPNAV 4790/26A)

This form (fig. 1-1) is used in the logbook and the Aeronautical Equipment Service Record (AESR). This section of the logbook/AESR contains a record of all explosive safety devices (for example, initiators and canopy releases) installed in the aircraft/major assemblies. Explosive devices installed in major assemblies/ equipment (for example, ejection seats and in-flight refueling stores) must be recorded in the Installed Explosive Safety Devices page of the appropriate AESR. Explosive devices installed in personnel parachutes are recorded on the Parachute Configuration Inspection and History Record, and when installed in other safety and survival equipment, on the History Card - Aviation Crew System. All other explosive safety devices must be recorded on the Installed Explosive Safety Devices Form of the log-book/AESR. This form is not required when the recording of escape system explosive components in F-14A aircraft is done in accordance with NAVAIR 11-100-1.1 (NOTAL).

Certain equipment is transferred from one aircraft to another during SDLM and replaced during periods of scheduled maintenance. This emphasizes the need to carefully and periodically check this record regarding the status of the explosive devices currently installed in the aircraft/equipment. This record is maintained in a current status by all activities having custody of performing rework on the aircraft/equipment in which explosive safety devices are installed.

Documentation requirements is a must. A single line entry is required for each installed explosive safety device. All data columns must be complete.

The following information explains what to report in each block.

Block 1—Aircraft Equipment/Model No. Enter the aircraft or equipment T/M/S.

Block 2—BUNO/Serial No. Enter the aircraft BUNO or equipment serial number.

Block 3—DODIC. Enter the Department of Defense Identification Code (DODIC) or the

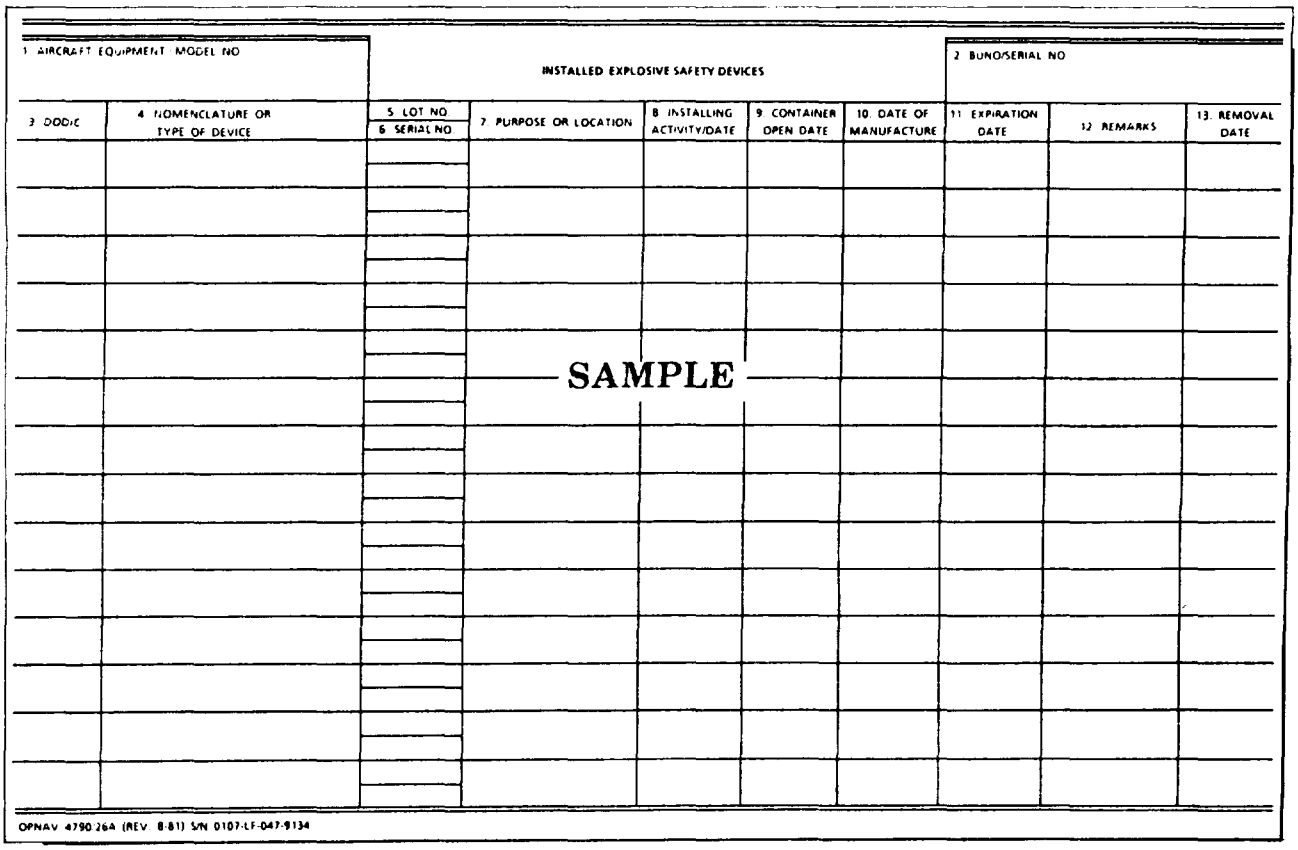

Figure 1-1.-Installed Explosive Safety Devices (OPNAV 4790/26A) (Logbook) (AESR).

Navy Ammunition Logistic Code listed in the Navy Ammunition Stock Microfiche, TWO10-AA-ORD-010/NA 11-1-116A (NOTAL). DODICs are also specified in the four technical manuals mentioned in the details for block 11.

Block 4—Nomenclature or Type of Device. Enter the name/type device.

Block 5—Lot No. Enter the lot number of the device.

Block 6—Serial No. Enter the serial number of the device. For devices not serialized, enter "NA."

Block 7—Purpose or Location. Enter the purpose or the location of the device.

Block 8—Installing Activity/Date. Enter the short title of the activity and the month and year that the device was installed; for example, VA34/JUL90.

Block 9—Container Open Date. Enter the month and year the container was opened; for example, JUL 90. When the container open date is not required for AEPS devices, "NA" will be entered.

Block 10—Date of Manufacture. Enter the date, month, and year of manufacture; for example, JUL 90. For CADS enter manufacture date, and for AEPS enter propellant manufacture date.

Block 11—Expiration Date. Enter the computed month and year; for example, JUL 90. Installed service-life expiration dates for explosive devices are computed from the date of manufacture, the date the hermetically sealed container is opened, and the date the device is installed. The method used in computing the expiration date of explosive devices and the number of months/years a specific device may remain in service is contained in NA 11-85-1-1.2(NOTAL), NA 11-100-1.1(NOTAL), NA 11-100-1.2(NOTAL), and NA 11-100-1.3(NOTAL). When installed explosive safety devices have extensions granted, the expiration date will be updated by drawing a line through the old expiration date and placing the new expiration date above it. The authority granting the extension, for example, message originator and date time group (DTG or IRAC number and manual), will be logged in the Remarks Column (block 12).

Block 12—Remarks. Make applicable remarks. This block is limited in size; use the Miscellaneous/History page if additional space is required.

Block 13—Removal Date. Enter the month and year the device was removed; for example, JUL 90.

POLICY FOR SAFETY PROGRAM

Learning Objective: *Recognize the importance of training personnel to fully comply with safety precautions and directives.*

While no attempt has been made in this training manual to cover all the areas of safety responsibility pertaining to the AME rating, enough has been presented to stress to the AME1 and AMEC the importance of safety. Senior AMEs must continually strive to improve the safety program.

The AME must interpret and apply safety directives and precautions established by the Department of the Navy, type commander, local command, and the precautions required for each job. Safety directives and precautions must be followed to the letter. This will save lives, prevent injuries, and prevent damage to equipment. Should an occasion arise in which doubt exists about the application of a particular directive or precaution, the measure to be taken is that which will achieve maximum safety. A shipboard operation requires more attention to safety than a shore-based operation. Although, in most instances, the hazards and the precautions are the same whether the work is done afloat or ashore.